

**Fig. 50-4.** Leaf cells can be likened to miniature factories. Raw materials (water and minerals) are processed (photosynthesis). The product (food) nourishes the tree.

food for the tree. See Fig. 50-4. This food is needed to keep the tree alive and growing. In addition, the leaves give off oxygen as a by-product of photosynthesis. This benefits other living things that depend on oxygen for life.

Water, gases, and nutrients (nourishing ingredients) flow throughout the tree. They flow through a thin layer of living cells called the **cambium**. The cambium surrounds the tree and is the only living part of the trunk. See Fig. 50-5.

The cambium layer is vital to the tree's life. Damaging the cambium can interrupt the flow of water, gases, and nutrients. If this happens, the cells above the damaged area soon die. This can result in the death of either part, or all of the tree. Stripping bark from a tree often destroys the cambium. Lightning, disease, and insects can also damage the cambium.

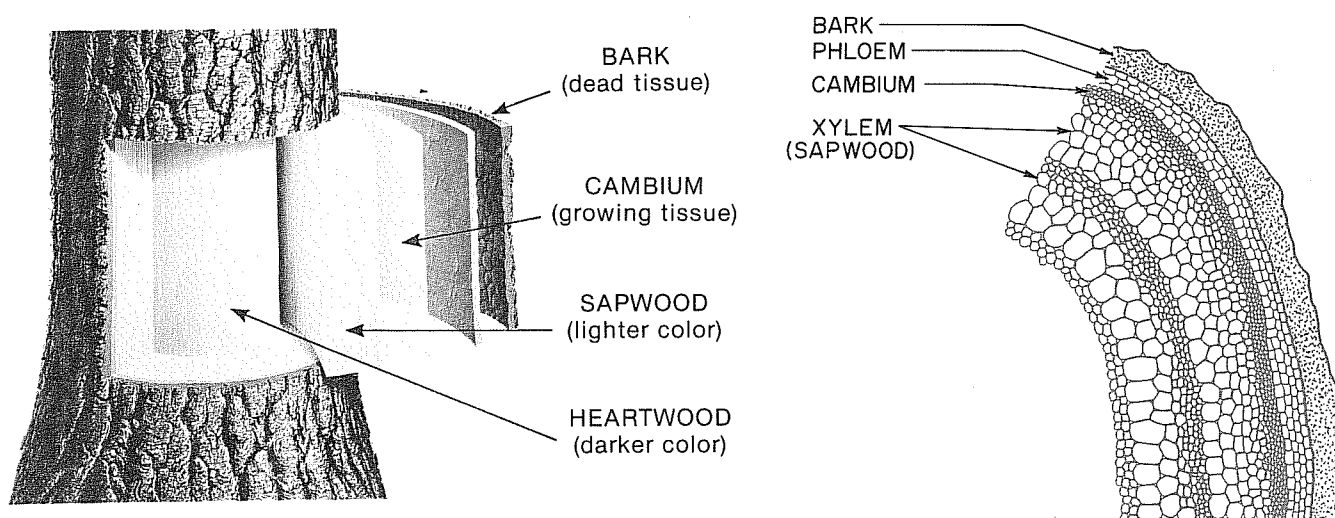
The cambium is made up of two types of cells. They are **xylem** and **phloem**. Xylem cells are formed on the inside of the cambium. They transport water and minerals from the root system up through the tree.

Old xylem cells become wood as they are replaced by new cells. This freshly made wood is called **sapwood**. See again Fig. 50-5. Sapwood is generally light in color. It is also fairly porous (contains holes).

As the tree grows older, new layers of sapwood are added. They slowly compress the old wood in the center of the tree. As the wood is compressed, it dries out. This dry, dense wood is called **heartwood**. Heartwood is usually darker in color than sapwood.

Phloem cells are formed on the outside of the cambium. They transport food manufactured in the leaves throughout the tree. When

**Fig. 50-5.** Cutaway view of a tree trunk



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